

**In the claims:**

Claims 1-10 (canceled)

11. (currently amended) : A method of source normalization for modeling of speech

comprising the steps of:

providing an initial set of speech recognition models;

providing training data collected in a plurality of environments and

~~performing training the~~ a set of speech models jointly with a set of transformations

parameters using a maximum likelihood optimization method such that the set of

transformation parameters capture the effects of environmental variations and the speech

recognition model parameters capture the effects of speech variations. ~~on said initial~~

~~speech recognition model or following new speech recognition models to reduce the~~

~~recognition error rate by determining new speech recognition models and determining~~

~~new transformations jointly with the new speech recognition models.~~

12. (canceled):

13. (canceled) :

14. (previously presented) : An improved speech recognition system comprising:

a speech recognizer; and

a source normalization model coupled to said recognizer for recognizing incoming

speech; said model derived by a method of source normalization training for HMM

modeling comprising the steps of:

a) providing an initial speech recognition model and

b) performing on said initial speech recognition model the following steps to get a new

speech recognition model:

- b<sub>1</sub>) estimation of intermediate quantities;
- b<sub>2</sub>) performing re-estimation to determine probabilities;
- b<sub>3</sub>) deriving mean vector and bias vector; and
- b<sub>4</sub>) solving jointly for mean vector and bias vector.

15.(previously presented) : The recognizer of Claim 14 including the step b<sub>5</sub>) of replacing old speech recognition model for the calculated ones and step c ) determining after a new speech recognition model is formed if it differs significantly from the previous speech recognition model and if so repeating the steps b<sub>1</sub>-b<sub>5</sub>.

16. (previously presented) : The recognizer of claim 14 wherein said step b<sub>2</sub> includes one or more of performing re-estimation to determine initial state probability, transition probability, mixture component probability and environment probability.

17. (previously presented) : The recognizer of claim 14 wherein said step b<sub>2</sub> includes performing re-estimation to determine initial state probability, transition probability, mixture component probability and environment probability.

18. (previously presented) : The recognizer of claim 14 wherein said step b<sub>4</sub> includes solving jointly for mean vector and bias vector using linear equations and determining variances and transformations.

19. (previously presented) : The recognizer of claim 17 wherein said step b<sub>4</sub> includes solving jointly for mean vector and bias vector using linear equations and determining variances and transformations.

20. (previously presented) : The recognizer of claim 19 including the steps of replacing old speech recognition model for the calculated ones and determining after a new speech

recognition model is formed if it differs significantly from the previous model and if so repeating the steps b1-b5.

21. (previously presented) : A method of source normalization for modeling of speech comprising the steps of:

- a) providing an initial speech recognition model and
- b) performing on said initial speech recognition model the following steps to get a new speech recognition model:
  - b<sub>1</sub>) estimation of intermediate quantities;
  - b<sub>2</sub>) performing re-estimation to determine probabilities;
  - b<sub>3</sub>) deriving mean vector and bias vector; and
  - b<sub>4</sub>) solving jointly for mean vector and bias vector.

22. (previously presented) : The method of Claim 21 including the step b<sub>5</sub>) of replacing old speech recognition model for the calculated ones and step c ) determining after a new speech recognition model is formed if it differs significantly from the previous speech recognition model and if so repeating the steps b<sub>1</sub>-b<sub>5</sub>.

23. (previously presented) : The method of claim 21 wherein said step b<sub>2</sub> includes one or more of performing re-estimation to determine initial state probability, transition probability, mixture component probability and environment probability.

24. (previously presented) : The method of claim 21 wherein said step b<sub>2</sub> includes performing re-estimation to determine initial state probability, transition probability, mixture component probability and environment probability.

25. (previously presented) : The method of claim 21 wherein said step b<sub>4</sub> includes solving jointly for mean vector and bias vector using linear equations and determining variances and transformations.

26. (previously presented): The Method of claim 24 wherein said step b<sub>4</sub> includes solving jointly for mean vector and bias vector using linear equations and determining variances and transformations.

27. (previously presented) : The method of claim 26 including the step b<sub>5</sub>) of replacing old speech recognition model for the calculated ones and step c) determining after a new speech recognition model is formed if it differs significantly from the previous speech recognition model and if so repeating the steps b<sub>1</sub>-b<sub>5</sub>.